Customer No.: 31561
Docket No.: 11845-US-PA
Application No.: 10/707,684

REMARKS

Present Status of the Application

The Office Action rejected all presently-pending claims 1-20. Specifically, the Office Action rejected claims 1-6, 8 under 35 U.S.C. 102 (e) as anticipated or 35 U.S.C. 103(a) as obvious over Combs (U.S. 6,734,552). The Office Action rejected claim 7 under 35 U.S.C. 103(a) as being unpatentable over Combs in view of Call (U.S. 5,471,027). The Office Action rejected claim 8 under 35 U.S.C. 103(a) as being unpatentable over Combs in view of Huang (U.S. 6,844,622). The Office Action rejected claims 9-18, 20 under 35 U.S.C. 103(a) as being unpatentable over Combs in view of Yang (U.S. 2003/0141582). The Office Action rejected claims 9-18, 20 under 35 U.S.C. 103(a) as being unpatentable over Combs in view of Yang (U.S. 2003/0141582). The Office Action rejected claims 9, 12-13, 16, 18, 20 under 35 U.S.C. 103(a) or 35 U.S.C. 102 (e) as being unpatentable or anticipated over Pu (US. 6,610,560). The Office Action rejected claim 19 under 35 U.S.C. 103(a) as being unpatentable over Pu in view of Call. The Office Action rejected claim 20 under 35 U.S.C. 103(a) as being unpatentable over Pu in view of Huang.

Applicants have amended claims 1, 9 and cancelled claims 2, 10 to overcome the rejection. After entry of the foregoing amendments, claims 1, 3-9, 11-20 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Discussion of Office Action Rejections

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Applicants respectfully traverse the rejection of claims 1-6, 8 under 103(a) as obvious over Combs (U.S. 6,734,552) because a prima facie case of obviousness has not been established by the Office Action.

To establish a prima facie case of obviousness under 35 U.S.C. 103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element in the claims. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skilled in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three requirements must " be found in the prior art, and not be based on applicant's disclosure." See M.P.E.P. 2143, 8th ed., February 2003.

The present invention is in general related to a chip package structure as claim 1 recites:

Claim 1. A chip package structure, comprising:
a carrier;
a chip, having an active surface with a plurality of bumps thereon, wherein the chip is flipped over and bonded to the carrier in a flip-chip bonding process so that the chip and the carrier are electrically connected;
a heat sink, set over the chip, ***wherein the chip is separated from the heat sink by a distance between 0.03 ~ 0.2mm;*** and
an encapsulating material layer, filling a bonding gap between the chip and the carrier as well as a gap between the heat sink and the chip, wherein the encapsulating material layer is formed in a simultaneous molding process and part of the surface of the heat sink away from the chip is exposed.

Combs fails to teach or suggest that the chip is separated from the heat sink by a distance between 0.03~0.2 mm. The Office Action points out it would have been obvious to one skilled

in the art to have selected and optimized the distance between the heat sink and the chip. However, Applicants do not agree. Paragraph [0007] of the specification discloses in a conventional chip package, because the conductive wires 24 are positioned between the chip 20 and the heat sink 36a, a minimum distance of separation of between 0.25~0.5 mm must be set aside for accommodating the conductive wires 24. The minimum distance of 0.25~0.5 mm is apparently larger than 0.03~0.2 mm of the claimed invention. Similarly, in Combs's reference, the package structure of Fig. 1 also has wires 104 therein between the chip 130 and the heat sink 110. The distance between the chip 130 and the heat sink 110 must be set larger than a minimum distance. Therefore, the distance between the heat sink and the chip set between 0.03~0.2 mm is not obvious.

Since Combs fails to teach or suggest that the chip is separated from the heat sink by a distance between 0.03~0.2 mm, Combs does not teach or suggest each and every element in claim 1. In addition, there is not any suggestion or motivation to combine the reference in a manner resulting in claim 1. Applicant respectfully submits that independent claim 1 patently defines over the prior art reference, and should be allowed. For at least the same reasons, dependent claims 3-6, 8 patently define over the prior art as well.

Applicants respectfully traverse the rejection of claim 7 under 103(a) as being unpatentable over Combs (U.S. 6,734,552) taken with Call (US 5,471,027) and the rejection of claim 8 under

103(a) as being unpatentable over Combs (U.S. 6,734,552) taken with Huang (US 6,844,622) because a prima facie case of obviousness has not been established by the Office Action.

Applicants submit that, as disclosed above, Combs fails to teach or suggest each and every element of claim 1, from which claims 7-8 depend. Call and Huang also fail to teach or suggest that the chip is separated from the heat sink by a distance between 0.03~0.2 mm. Therefore, Call and Huang cannot cure the deficiencies of Combs. Independent claim 1 is patentable over Combs, Call and Huang. For at the least the same reasons, its dependent claims 7-8 are also be patentable.

Applicants respectfully traverse the rejection of claims 9-18, 20 under 103(a) as obvious over Combs (U.S. 6,734,552) taken with Yang (US 2003/0141582) because a prima facie case of obviousness has not been established by the Office Action.

The present invention is in general related to a chip package structure as claim 9 recites:

Claim 9. A chip package structure, comprising:
a carrier;
a chipset, set over and electrically connected to the carrier, wherein the chipset comprises a plurality of chips, at least one of the chips is bonded to the carrier or another chip in a flip-chip bonding process so that a flip-chip bonding gap is created;
a heat sink, set over the chipset, ***wherein the chipset is separated from the heat sink by a distance between 0.03 ~ 0.2mm***; and
an encapsulating material layer, filling the flip-chip bonding gap and a gap between the chipset and the heat sink, wherein the encapsulating material layer is formed in a simultaneous molding process and part of the surface of the heat sink away from the chipset is exposed.

As discussed above, Combs fails to teach or suggest that the chipset is separated from the heat sink by a distance between 0.03~0.2 mm. Yang also fails to teach or suggest that the chip set is separated from the heat sink by a distance between 0.03~0.2 mm. In Yang's reference, two or three chips are stacked on a substrate, and a package material 180 encloses the chips and wires on the substrate. However, Yang does not disclose the package structure has a heat sink and heat sink and the chips have a distance between 0.03-0.2 mm. Yang cannot cure the deficiencies of Combs. Therefore, independent claim 9 is patentable over Combs and Yang. For at the least the same reasons, its dependent claims 10-18, 20 are also be patentable.

Applicants respectfully traverse the rejection of claims 9, 12-13, 16, 18, 20 under 35 U.S.C. 103(a) or 35 U.S.C. 102 (e) as being unpatentable or anticipated over Pu (US. 6,610,560) because Pu does not teach every element recited in these claims and a prima facie case of obviousness has not been established by the Office Action.

Pu fails to teach or suggest that the chip set is separated from the heat sink by a distance between 0.03~0.2 mm. In Pu's reference, the package structure, as shown in Fig. 2D, includes three chips 210, 220, 230 and a heat sink 290, wherein the surfaces 220b, 230b of the chips 220, 230 are exposed to the outside of the encapsulation body 270, and thus the heat sink 290 can be coupled thereto (col.4, line 66- col. 5, line1). Therefore, the chips and the heat sink have a distance closing to zero. Similarly, Applicants do not agree that it would have been obvious to one skilled in the art to have selected and optimized the distance between the heat sink and the

chipset. This is because Pu discloses the chips (or chipset) and the heat sink have a distance closing to zero. Pu does not teach or suggest that the chips (or chipset) and the heat sink have a specific distance that is between 0.03~0.2 mm, and the distance is not obvious as discussed above. Therefore, Pu does not teach or suggest each and every element in the claim 9. Applicant respectfully submits that independent claim 9 patently defines over the prior art reference, and should be allowed. For at least the same reasons, dependent claims 12-13, 16, 18, 20 patently define over the prior art as well.

Applicants respectfully traverse the rejection of claim 19 under 103(a) as being unpatentable over Pu taken with Call and the rejection of claim 20 under 103(a) as being unpatentable over Pu taken with Huang because a prima facie case of obviousness has not been established by the Office Action.

Applicants submit that, as disclosed above, Pu fails to teach or suggest each and every element of claim 9, from which claims 19-20 depend. Call and Huang also fail to teach or suggest that the chipset is separated from the heat sink by a distance between 0.03~0.2 mm. Therefore, Call and Huang cannot cure the deficiencies of Pu. Independent claim 9 is patentable over Pu, Call and Huang. For at the least the same reasons, its dependent claims 19-20 are also be patentable.

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CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 1, 3-9, 11-20 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,

Date : May 25, 2005

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